

| Notice of Allowability | Application No. | Applicant(s) | |
|-------------------------------|-------------------------|---------------------|--|
| | 08/588,637 | BARBOUR ET AL. | |
| | Examiner | Art Unit | |
| | Rodney P. Swartz, Ph.D. | 1645 | |

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address--*

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. This communication is responsive to interview 5 December 2005.
2. The allowed claim(s) is/are 1,2,4,7,8,10,12 renumbered 1-7.
3. Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some* c) None of the:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. 07/422881.
 3. Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) hereto or 2) to Paper No./Mail Date _____.
 - (b) including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. Notice of References Cited (PTO-892)
2. Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. Notice of Informal Patent Application (PTO-152)
6. Interview Summary (PTO-413),
Paper No./Mail Date 12/05.
7. Examiner's Amendment/Comment
8. Examiner's Statement of Reasons for Allowance
9. Other _____.

DETAILED ACTION

1. Attached is an Interview Summary, dated 5 December 2005.
2. Claims 1-4, 6-10, 12, and 13 are pending and under consideration.

EXAMINER'S AMENDMENT

3. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment, was given in a telephone interview with Thomas J. Kowalski, Reg. No. 32,147, who requested that the amendments be made without prejudice, without admission, without surrender of subject matter, and without any intention of creating any estoppel as to equivalents, on 5 December 2005.

4. The application has been amended as follows:

IN THE CLAIMS:

1. (Currently Amended) A method for inducing an immunological response, including OspA specific serum IgA antibodies in a mammalian host susceptible to Lyme disease or *Borrelia burgdorferi* infection comprising mucosally orally administering a composition comprising substantially pure outer surface protein A (OspA) and a carrier or diluent which is free of any immunogenicity-enhancing adjuvant.
2. The method of claim 1 wherein the OspA is lipidated OspA.

3. Canceled
4. (Currently Amended) The method of claim 3 1 wherein the carrier or diluent is a liquid.
5. Previously canceled.
6. Canceled
7. The method of claim 1 wherein the OspA is recombinant OspA.
8. The method of claim 7 wherein the OspA is lipidated.
9. Cancelled
10. (Currently Amended) The method of claim 8 wherein the OspA is obtained by: transforming a host organism by a plasmid containing a gene coding for a full-length wild-type *Borrelia burgdorferi* OspA lipoprotein and producing recombinant *Borrelia burgdorferi* OspA lipoprotein, and purifying the recombinant *Borrelia burgdorferi* OspA lipoprotein substantially free from other bacterial proteins, and from lipopolysaccharide, under non-denaturing conditions from a lysate of the host organism so as to obtain a purified recombinant *Borrelia*

burgdorferi OspA lipoprotein which remains lipitated and is in a form
administable to the host.

11. Previously canceled.
12. The method of claim 1 wherein the composition comprising substantially pure OspA and a carrier or diluent is a solution, suspension, emulsion, syrup, elixir, capsule, tablet, hard-candy-like preparation, or a solid food item.
13. Cancelled

Rejection Withdrawn/Moot

5. The rejection of claims 3, 6, 9, and 13 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 2 of U.S. Patent No. 5,688,512 in view of Cohen is moot in light of the cancelation of the claims.
6. The rejection of claims 1-2, 4, 7-8, 10, and 12 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 2 of U.S. Patent No. 5,688,512 in view of Cohen is withdrawn in light of applicants' further arguments and the amendment of the claims.

Applicants argue that references teaching the advantages of oral administration of rabies vaccine in the form of bait to reduce the zoonotic infection of wild animals (U.S. Pat. No. 4,320,115) and teaching the advantages of oral administration of polio virus vaccine (*Dev. Biol. Stand.*, Vol. 41, pp. 141-148, 1978) do not provide a reasonable expectation of success of

eliciting an effective response including IgA antibodies when administering bare protein without adjuvant.

The examiner has considered applicants' arguments, and finds them persuasive in light of an updated search on the state of the prior art at the time of filing which supports applicants' arguments.

The updated search supportive documents are exemplified by:

- (1) Crawford, *Science*, Vol. 240, no. 4854, p. 877(1), 1988, in which a vector was administered orally, not bare protein.
- (2) Yoshimura, *Archives of Otolaryngology Head and Neck Surgery*, Vol. 117(8), pp. 889-894, 1991, in which oral induction of mucosal immunity was taught by using enteric capsules, not bare protein.
- (3) Tuboly et al, *Res. In Veterinary Sci.*, Vol. 54(3), pp. 345-350, 1993, in which IgA response varied upon viral vector used and adjuvant was necessary, and there was no indication of response to bare protein.
- (4) Muir et al, *Immunology Letters*, Vol. 42(3), pp. 203-207, 1994, in which microencapsulated antigen produced an IgA response, but bare protein was not used.
- (5) Valentine et al, *Vaccine*, Vol. 12(2), pp. 138-146, 1996, in which oral administration of antigen failed to elicit a systemic IgA response.
- (6) Fujihashi et al, *J. of Exp. Med.*, Vol. 183(4), pp. 1929-1935, 1996, in which bare protein was administered, but not without adjuvant.

Conclusion

7. Claims 1-2, 4, 7-8, 10, and 12 are allowed.

8. The following is an examiner's statement of reasons for allowance: claims 1-2, 4, 7-8, 10, and 12 are allowed following discussions of references with the attorney of record, Thomas J. Kowaski, see *supra*. The claims are deemed allowable because the prior art does not provide a reasonable expectation of success of eliciting an effective response including IgA antibodies when bare protein is administered without adjuvant.

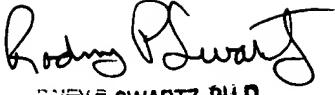
Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney P. Swartz, Ph.D., Art Unit 1645, whose telephone number is (571) 272-0865. The examiner can normally be reached on Monday through Thursday from 5:30 AM to 4:00 PM EST.

If attempts to reach the Examiner by telephone are unsuccessful, the examiner's supervisor, Lynette F. Smith, can be reached on (571)272-0864.

The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


RODNEY P. SWARTZ, PH.D
PRIMARY EXAMINER
Art Unit 1645

December 7, 2005